

Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (currently amended) An optical multiplex transmission method for transmitting optical signals from a first optical transmission line to a second transmission line, comprising:

transmitting an optical signal group across a plurality of nodes in network wherein said second transmission line connects a first node to a next second node;

for each of said nodes in said network, accepting from a first optical transmission line a multiplexed optical signal group, said optical sign group having a plurality of optical wavelength signals and outputting the resulting multiplexed optical wavelength signals to a second transmission line;

wherein in the processing of outputting the multiplexed optical wavelength signal to said second transmission line, specifying wavelengths which are not used only in the second optical line by checking state of usage of wavelengths in [[each]] said next second node;

converting at least one of the optical wavelength signals included in the optical signal group, into a wavelength-converted optical wavelength signal whose wavelength is one among the wavelengths not used only in the second optical transmission line having an arbitrary wavelength respectively; and

multiplexing said at least one said wavelength-converted ~~of the~~ optical wavelength signal with at least one other of the optical wavelength signals included in said optical signal group wherein said wavelength-converted optical wavelength signal is not multiplexed with the optical wavelength signal from which said wavelength-converted optical wavelength signal was originally converted; ~~and~~
~~outputting the resulting multiplexed optical wavelength signals to a second transmission line.~~

2. (currently amended) An optical multiplex transmission method for transmitting optical signals from a first optical transmission line to a second transmission line comprising:

transmitting optical signal groups across a plurality of nodes in network wherein said second transmission line connects a first node to a next second node;

for each of said nodes, accepting from a first optical transmission line, a first multiplexed optical signal group have a plurality of optical wavelength signals, and accepting from a second optical transmission line a second multiplexed optical signal group having a plurality of optical wavelength signals;

specifying wavelengths which are not used only in the second optical line by checking state usage of wavelengths in [[each]] said next second node;

converting a first optical wavelength signal included in the first optical signal group, into a second converted optical wavelength signal, whose wavelength is one among the wavelengths not used only in the second optical transmission line ~~different from that of said first optical wavelength signal;~~

multiplexing at least one of the optical wavelength signals included in said first optical signal group, at least one of the optical wavelength signals included in the second optical signal group, and the second converted optical wavelength signal, and then outputting the resulting multiplexed optical wavelength signals to a third optical signal line; and

multiplexing at least one of the optical wavelength signals from said first optical signal group aside from the ~~the~~ optical signals to be outputted to the third optical signal line, and at least one of the optical signals from said second optical signal group aside from said optical signals to be outputted to said third optical signal line, and then outputting the resulting multiplexed optical wavelength signals to a fourth optical signal line.

3. (currently amended) An optical multiplex transmission method comprising:

transmitting an optical signal group across a plurality of nodes in network;

wherein at any a first node apparatus in said network;

receiving an optical signal group in which the plurality of optical wavelength signals are multiplexed;

transmitting at least one of the optical wavelength signals included in the optical signal group, to a next second node apparatus connected with the first node apparatus, wherein said second node apparatus that transmits optical signals from the first optical transmission line to the second optical transmission line and transmitting the resulted multiplexed optical wavelength signals to a third node apparatus connected with

the second node apparatus;

wherein in the processing of outputting the multiplexed optical wavelength signal to said second transmission line, specifying a waveform not used in the second optical transmission line;

receiving the optical wavelength signals transmitted from said first node apparatus;

converting one of the optical wavelengths received from the first node device into said one wavelength which is not used only in the second optical transmission line; and

~~converting at least one of the optical wavelength signals in the optical signal group thus received, into a wavelength-converted optical wavelength signal having an arbitrary wavelength respectively;~~

~~multiplexing said at least one wavelength-converted optical wavelength signal with at least one of the optical wavelength signals included in the optical signal group received by the second node, wherein said wavelength-converted optical wavelength signal is not multiplexed with the optical wavelength signal from which said wavelength-converted optical wavelength signal was originally converted; and~~

~~transmitting the resulted multiplexed optical wavelength signals to a third node apparatus connected with the second node apparatus.~~

4. (currently amended) A method wherein a node apparatus in a network of a plurality of node apparatuses multiplexes optical wavelength signals and transmits the resulting multiplexed optical wavelength signals, comprising:

at any one of said nodes transmitting optical signal groups across a plurality of nodes in network;

receiving a first optical signal group from a first optical transmission line, and a second optical signal group from a second optical transmission line;

optically multiplexing at least one of the optical wavelength signals included in the first optical signal group, and at least one of optical wavelength signals included in the second optical signal group, and then outputting the resulting multiplexed optical wavelength signals to a third optical transmission line;

optically multiplexing at least one of the optical wavelength signals included in each of the first and second optical signal groups, except the optical signals to be outputted to the third optical transmission line, and then outputting the resulting multiplexed optical wavelength signals to a fourth optical transmission line; ~~and~~

specifying a wavelength which is not used only in the third optical transmission line; and

converting an optical wavelength signal included in the first optical signal group, into a second converted optical wavelength signal whose wavelength is one among the specified wavelengths not used only in the [[second]] third optical transmission line ~~different from that of the first optical wavelength signal~~, and then transmitting ~~said~~ the second converted optical wavelength signal to ~~[[another]]~~ said third node apparatus which is next to said first and second node apparatuses.

5. (currently amended) An optical transmission apparatus comprising:

a plurality of communication nodes in a network, each of said nodes
having:

an input wavelength demultiplexing unit which receives a first multiplexed optical signal group from a first optical transmission line and demultiplexes said [[a]] first multiplexed optical signal group having a plurality of optical wavelength signals into the optical wavelength signals of the respective wavelengths;

a wavelength multiplexing unit which multiplexes a plurality of optical wavelength signals, and which outputs the resulting multiplexed optical wavelength signals to a second optical transmission line to second next node in said communication network;

a specific wavelength dropping unit which externally outputs predetermined optical signals among the optical wavelength signals demultiplexed by the input wavelength demultiplexing unit;

a specific wavelength adding unit which outputs optical wavelength signals having predetermined wavelengths in a second optical signal group including a plurality of optical wavelength signals externally inputted, to the wavelength multiplexing unit; and

a wavelength converting unit which converts at least one optical wavelength signal among the optical wavelength signals demultiplexed by the input wavelength demultiplexing unit according to the information of waveforms received from an operation system, into a wavelength-converted optical wavelength signal whose wavelength is one among the waveforms not used only in the second optical transmissions line ~~having an arbitrary wavelength respectively~~ and which outputs the

wavelength-converted optical wavelength signal to the specific wavelength adding unit.

6. (currently amended) An optical transmission apparatus transmitting optical signals from a first optical transmission line to a second optical transmission line comprising:

a plurality of communication nodes in a network, each of said nodes having:

means which derives at least one optical wavelength signal from within an optical signal group including optical wavelength signals received from said first optical transmission line, and which outputs the derived optical wavelength signal outside the optical transmission apparatus;

means which converts at least one of the optical wavelength signals included in the optical signal group according to the information of wavelength received from an operation system into a wavelength converted optical wavelength signal whose wavelength is one among the wavelengths not used only in the second optical transmission line ~~having an arbitrary wavelength respectively~~; and

means which outputs for outputting the wavelength-converted optical wavelength signals to a next second node in the network, and the optical signals which are included in the optical signal group and whose wavelengths are not converted.

7. (previously presented) An optical transmission apparatus according to Claim 3, wherein the wavelength converting unit comprises:

an optoelectric conversion portion which converts the optical wavelength signal

into an electrical signal;

a switching portion which selects a connection route for the electric signal; and
an electrooptic conversion portion.

8. (previously presented) An optical transmission apparatus according to Claim 3, wherein the wavelength converting unit includes:

a switching portion which selects a connection route for said optical wavelength signal; and

a specific wavelength conversion portion which converts the wavelength of said optical wavelength signal into a specific wavelength.

9. (currently amended) An optical network comprising:

a plurality of node apparatuses each of which includes the optical multiplexing apparatus as defined in Claim 3,

wherein the plurality of node apparatuses are connected in a scheme selected from the group consisting of one liner, a ring shape and a mesh shape.

10. (currently amended) An optical network according to Claim 7, further comprising:

means for determining wavelength conversion methods in the node apparatuses relevant to an accepted channel connection request for connecting the first and second node apparatuses; and

means for giving commands of the determined conversion methods to the

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respective node apparatuses.